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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/967,048	09/28/2001	Athanasios A. Kasapi	15685P108	4810

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EXAMINER
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VU, THAI

ART UNIT	PAPER NUMBER
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2643

DATE MAILED: 07/30/2004

3

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/967,048

Applicant(s)

KASAPI, ATHANASIOS A.

Examiner

Thai Vu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 September 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>2</u> .   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 3, 5-9 and 13-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Gerlach et al. (Pat #: 5,634,199 , hereinafter "Gerlach").

Regarding claim 1 Gerlach teaches

receiving information for transmission to a receiver (i.e.  $f(t)$ , FIG. 3) ; and  
generating a plurality of sub-carriers to redundantly transmit the  
information to a user over a multi-carrier wireless communication channel (i.e.  $s(t) \dots s_l(t)$ , FIG.4), wherein each of the sub-carriers is modified by a set of  
complex weights (i.e.  $W \dots W_l$ , column 4 line 64 - column 5 line 2 ) to ensure that  
each of the sub-carriers of the wireless communication channel propagates along  
a different physical path to the receiver (i.e. signals routed to different antennas,  
FIG 4.)

Regarding claim 3, Gerlach further teaches limitations of the claim in (i.e.  $W \dots W_l$ , FIG. 4, column 11 lines 36-53); and (i.e.  $W \dots W_l$ , each signal in the  
schematic is modified by a weight vector  $W$ , FIG. 4).

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Regarding claim 5, Gerlach further teaches limitations of the claim in column 12 lines 64-column 13 –20 (i.e. weight values derived from computed from predetermined values stored in a look-up table).

Regarding claim 6, Gerlach further teaches limitation of the claim in (i.e. plurality antennas shown in FIG. 4; Abstract).

Regarding claim 7, Gerlach teaches a transceiver comprising:

a diversity agent (i.e. box W in FIG. 4) to selectively develop and apply a set of complex weight values to each of a plurality of signals, each corresponding to a sub-carrier of a multi-carrier communication channel (i.e.  $s(t) \dots s_{\backslash}(t)$ ) to introduce spatial diversity between such sub-carriers (column 3 lines 17-33) ; and

a transmit module, coupled with the diversity agent, to receive the modified sub-carriers and transmit the signals to generate a multi-carrier communication channel with intra-channel spatial diversity (FIG 4. Quadrature Upconverter boxes).

Regarding claim 8, Gerlach further teaches limitation of the claim in (FIG. 4  $s(t)$ ; column 10 lines 55-56).

Regarding claim 9, Gerlach further teaches limitation of the claim in (FIG. 4).

Regarding claim 13, Gerlach further teaches the limitation of the claim in FIG. 4, (i.e. Quadrature Upconverter).

Regarding claim 14, Gerlach further teaches the limitation of the claim in FIG. 1 and column 4 lines 3-5.

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Regarding claim 15, Gerlach teaches the limitation of the claim in column 12 lines 64-column 13 –20 (i.e. look up table).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gerlach in view of Ide et al. (Pat #: 6,754,467, hereinafter Ide).

Regarding claim 2, Gerlach teaches all subject matters as claimed above, but fails to teach each element of the set of complex weights scales one or more of a sub-carriers amplitude and/or phase at an associated transmission antenna.

However Ide teaches such limitations in column 5 lines 5-13 for a purpose of forming a transmission pattern.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate Gerlach's method to provide a complex weight set for controlling signal amplitude and phase in order to form a transmission pattern as taught by Ide.

5. Claims 4 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerlach in view of Raleigh et al. (Pat #: 6,452,981, hereinafter Raleigh).

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Regarding claim 4, Gerlach teaches all subject matters as claimed above but fails to teach the substantially different weights are chosen to be orthogonal to the others.

However Raleigh teaches a choice of the weight vectors for making the output signals substantially orthogonal to one another in column 16 lines 51-55.

Therefore, it would have been obvious to one of skill in the art at the time the invention was made to modify Gerlach system to provide the weight vector to be orthogonal to one another in order to make the output signal substantially orthogonal as taught by Raleigh.

Regarding claim 10, Gerlach teaches all subject matters as claimed above, but fails to clearly teach each of the set of complex weights are comprised of a plurality of weight values each associated with one of a plurality of antennae comprising an antenna array through which the sub-carriers are transmitted.

However Raleigh teaches such limitation in with elements TSW FIG. 13 and column 16 line 2-26 for a purpose of spatial processing.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gerlach's system to provide each of the set of complex weights comprised of a plurality of weight values each associated with one of a plurality of antennae comprising an antenna array through which the sub-carriers are transmitted to take advantage of multiple transmitter antennas and or multiple receive antennas to ameliorate the deleterious effects of the inherent characteristics of wireless media as taught by Raleigh (column 1 lines 60-63).

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Regarding claim 11, Raleigh further teaches the set of weight vectors spatial directions can be made substantially orthogonal to one another in column 16 lines 51-55.

Therefore, it would have been obvious to one of skill in that art at the time the invention was made to modify Gerlach system to provide the set of complex weight values for a given baseband signal to be maximally orthogonal complex weight values applied to another baseband signal in order to made the output signal substantially orthogonal as taught by Raleigh.

Regarding claim 12, Gerlach further teaches the limitations of the claim in column 11 lines 36-53 and FIG. 4.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thai Vu whose telephone number is 703-305-3417. The examiner can normally be reached on 9:00AM-6:00PM, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz can be reached on 703-305-3900. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thai Vu  
Examiner  
Art Unit 2643



**BINH TIEU**  
**PRIMARY EXAMINER**